

**Work Order ID 67880**

Monday, April 04, 2011 8:39:10 AM



Page 1

Item ID: D212-664-107

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Low Standard Fwd

Start Date: 4/4/2011 Start Qty: 1.00

Required Date: 4/20/2011 Req'd Qty: 1.00



Cust Item ID:

Customer:

Reference:

Run Start



Stop



Approvals:

Process Plan:       Date: 4-4-11

Tooling:

Date:       QC:       Date:       SPC (Y/N):       Date:       

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D212-664-147	Rev B								

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D212-664-107 CHG001

5/11/04/22

HJ for CL 11-6-22

110

0.00



Packaging

Packaging

Memo

0.00

Packaging

DP 11-5-4

120

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D212-664-107 using CNC bender program 212-107

DP 11-5-4

B 67880

W/O: \_\_\_\_\_

**WORK ORDER CHANGES**

DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

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Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130  QC Quality Control	QC15- Crosstube Dimensional Check  Memo	0.00 0.00				(40)			
140  Crosstubes Crosstubes	Crosstubes  Memo 1-Cut tube as per inspection dwg and deburr ends. ***ensure saw is square*** 2-Position cuffs on tube ensure proper positioning 3-Drill tube as per dwg using DT8577 location #7 & # 212 ULF using jig DT8548 and DT8549 as per QSI 10 4-Transfer drill rivet holes from cuff into tube. 5-Identify cuff position and Batch # on each and identify tube as per dwg D212-664-107. 6- Inspect surface damage 7- Deburr and realodine cuff.	0.00 0.00							

SAD  
TW  
11-05-17  
SAD  
11-05-17

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

150

Crosstubes Chemical Conversion

0.00



HandFXtube

Memo

0.00

Hand Finishing Crosstubes

STW  
SAD 11-05-17  
11-05-17 (1)

160

QC3- Inspect Part Finish

0.00



QC

Memo

0.00

Quality Control

Substis

170

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

Substis

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No <sup>4</sup> DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Run Start

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180  Outsource2	Outsource process - NDT per QSI038 4.1	0.00							
	Memo	0.00							
	Liquid Penetrant Inspection as per QSI 038Or Issue P/O: <u>14143</u> LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order								
190  Packaging	Packaging	0.00							
	Memo	0.00							
	Ensure copy of NDT results attached to work order.								
200  QC	QC5- Inspect part completeness to step on W/O	0.00							
	Memo	0.00							
	Quality Control Inspect for damage & ensure results are as per Dwg D212-664-107								

CL 11/05/20 ①

11/05/20 CL

ST 11-05-20

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Customer:

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Run Start



Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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210

0.00



Crosstubes

Crosstubes

Memo

0.00

1-Rivet Cuffs as per Dwg D212-664-147. with Sika flex in Between tube & Cuff  
A/R SIKAFLEX -241/-291 BATCH: 11751425 11-05-24

220

0.00



SprayPaint

SprayPaint

Memo

0.00

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

25 11-05-24

PRIME:

Start Time: 9:00Finish Time: 10:00

PAINT:

Start Time: 2:00Finish Time: 3:00

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Cust Item ID:

Required Date: 4/20/2011 Req'd Qty: 1.00

Customer:

Reference:

Run Start

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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230

QC14- Inspect Spray Paint

0.00



QC

Memo

0.00

Quality Control

Wrap in plastic bag to protect from scratches

*AS* 11.05.25

240

Crosstubes

0.00



Crosstubes

Memo

0.00

Crosstubes

1- Assemble as per Dwg D212-664-147

2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

3- Instal support with ~~magnabond~~ *Pro Seal* 6398 per dwg D212-664-147, cure for 12hrs before packaging.

Time & date of application: 11:30 am

Batch: ~~111510~~ 117510

EXP. DATE 08/20/11

Torque: ml 11.06.21 (1)

*W* 11 06 *tb* (1)

W/O: 67880		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
11.06.09	240	No more M1921920-25 in stock, -26 are too long used M1921920-24 instead, B108258 x4	WJW	11.06.09	1	W	S wholeby
11.06.15	240	REMOVE/INSTALL SUPPORTS PER ATTACHED EMAIL	WJW	11.06.16	1	OP 11.06.15 DS1042	S wholeby

Part No: D212-664-107 PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Customer:

Reference:

Run Start



Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
250	QC5- Inspect part completeness to step on W/O	0.00							
QC	Memo	0.00							
Quality Control									
255	Pick Kit	0.00							
Packaging	Memo	0.00							
Packaging									
260	QC4- 100% Inspect kits for completeness	0.00							
QC	Memo	0.00							
Quality Control									

**POSITIVE RECALL**EFFECTIVE 11.06.15 AUTH GP  
RELEASED GP DATE 11.06.22

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Monday, April 04, 2011 8:39:10 AM

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Start Date: 4/4/2011 Start Qty: 1.00



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Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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270

0.00



Packaging

Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D212-664-107

11/6/22  
me

280

0.00



QC21- Final Inspection - Work Order Release

QC

Memo

0.00

Quality Control

11/6/22  
me  
11-06-22

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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# Picklist Print

Monday, April 04, 2011 8:39:17 AM

Page 1

Work Order ID: 67880

Parent Item: D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 4/4/2011

Required Date: 4/20/2011

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A New Issue 07.09.12 EC verified by: JLM  
 IPP Rev:B ECN 1100 08-01-11 DD verified by: EC  
 IPP Rev:C Ecn 1121 08-02-25 DD Verified by:ec IPP Rev:D  
 10.05.27 added pick kit DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
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D212-664-107TRN

Manufactured

No

140

Each

2.0000

1

1



Crosstube Turning Detail

Location

Loc Qty

Loc Code

LG

2

67428

1

1

D3659-1

Manufactured

No

220

Each

1.0000

2

2



CUFF

Location

Loc Qty

Loc Code

ST477

1

50691

1

CR3212-4-06

Purchased

No

240

Each

1,082.000

44

44



CHERRY RIVET

Location

Loc Qty

Loc Code

ST311

1082

112492

200

112724

82

112794

800

① 11-4-5

SAD 11-05-12

25 11-05-24

25 11-05-24

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Parent Item Name: Crosstube Low Standard Fwd

Start Date: 4/4/2011

Required Date: 4/20/2011

Start Qty: 1.00

Required Qty: 1.00

D3595-063-450 Manufactured No

240 Each

79.0000

4

4



RUBBER CUSHION

B#68893

Location

Loc Qty

Loc Code

LG

66

67353

66

LG055

13

67067

13

MS21920-25 Purchased No

240 Each

68.0000

4

4



Clamp(per MIL-DTL-8783C)

B108258  
MS21920-24 x4

Location

Loc Qty

Loc Code

LG050

68

116264

18

117279

50

D2893-1 Manufactured No

240 Each

15.0000

2

2



2.75 Support

B#68715 70736

Location

Loc Qty

Loc Code

LG052

15

66698

15

D3428-1 Manufactured No

260 Each

23.0000

1

1



Placard

B68920 11/6/21

Location

Loc Qty

Loc Code

ST053

23

66115

11

66961

12

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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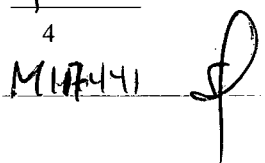
Start Qty: 1.00


Required Qty: 1.00

AN6-35A Purchased No 260 Each 100.0000 4  


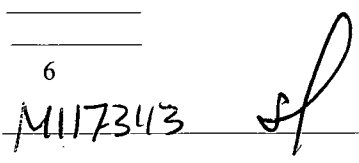
 BOLT


Location	Loc Qty	Loc Code
ST343	100	
113422	30	
115698	20	
116528	50	

AN6-36A Purchased No 260 Each 15.0000 4  



 Bolt


Location	Loc Qty	Loc Code
ST343	15	
117010	15	

MS21042L6 Purchased No 260 Each 126.0000 6  

 Nut

Location	Loc Qty	Loc Code
ST300	126	
116373	26	
116548	100	

AN960JD616 NAS1149D0663J Purchased No 260 Each 0.0000 18  

 Washer

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

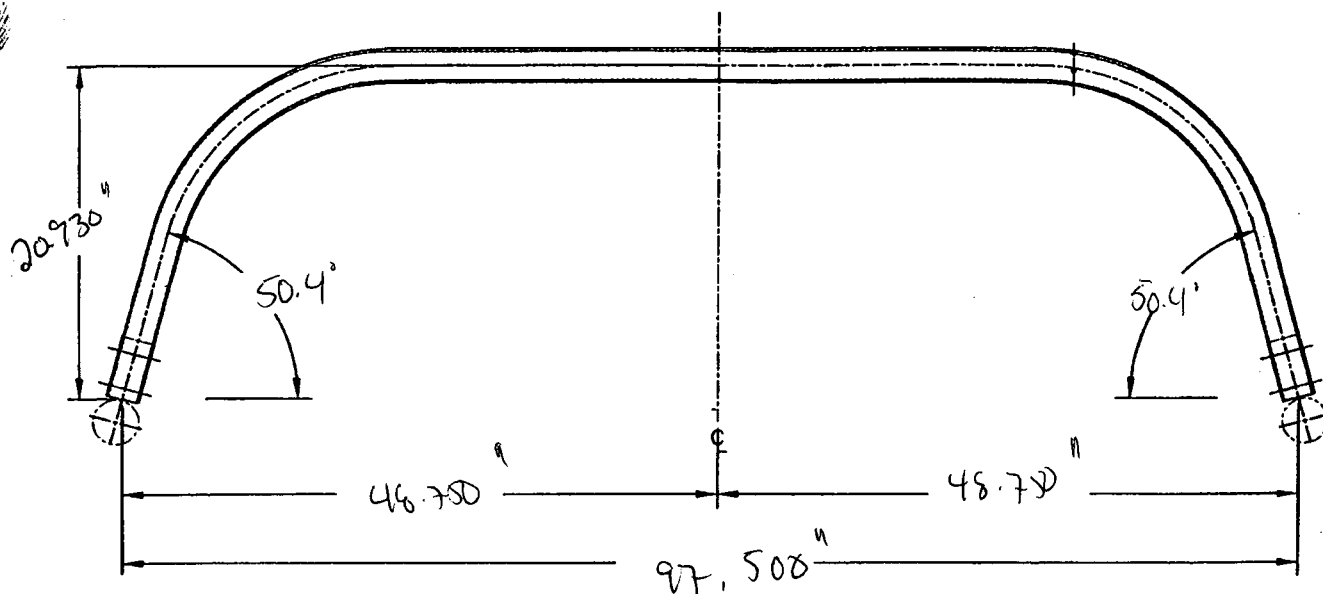
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**NOTE:** Date & initial all entries

<b>DART AEROSPACE LTD</b>	<b>Work Order:</b>	67880
<b>Description:</b> Crosstube Low Fwd (205/212/412)	<b>Part Number:</b>	D212-664-107
<b>Inspection Dwg:</b> D212-664-147 <b>Rev:</b> B		<b>Page 1 of 1</b>

Required Dimension	Min	Max
Height	20.79	21.05
1/2 Span	48.55	48.81
Angle	49	52
Total Span	97.1	97.62



Comments

QC15 Inspection	S. 10/05/04
Date	

Rev	Date	Change	Revised by	Approved
A	08.02.29	New Issue	KJ/JM	
B	10.01.21	Dwg Rev updated	KJ	

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Item	Qty -147	Qty -147B	Part Number	Description
1	X		D212-664-147	CROSSTUBE ASSEMBLY (205/212/412 LOW FWD)
2		X	D212-664-147B	CROSSTUBE ASSEMBLY (214 LOW FWD)
3	1	1	D6019-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	2	2	D3659-1	CUFF
7	4	4	MS21920-25	CLAMP (OR MS21920-26)
8	44	44	CR3212-4-06	RIVET (OR M7885/3-4-06)
9	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
10	A/R	A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

# GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6019-128  
FINISHED LENGTH = 126.528±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF  
USING VIBRATING STYLUS.
- 7) WEIGHT: D212-664-147 = 24.2 lbs (PER IIN-D212-664)  
D212-664-147B = 24.2 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE
- 9) WHEN MACHINING TAPER, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD  
BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6%  
BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.05" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF  
D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER  
INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1  
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE  
SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS.  
DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE  
UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS  
NOT BOTTOMED-OUT AFTER TORQUING.
- 16) INSTALL D3659-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF  
SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE.  
SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 17) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 67880  
PSA-044

RELEASED  
2009-10-29  
NW

B	REVISE GENERAL NOTES/PART LIST; UPDATE TO CURRENT STANDARDS; ADD -147B (ZN C4-2, D4-2)	RF	09.09.30
A	NEW ISSUE	CP	07.07.07
REV.	DESCRIPTION	BY	DATE
DESIGN	RF	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. B
MFG. APPR.	RF	D212-664-147	SHEET 1 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE (205/212/412 LOW FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2007 BY DART AEROSPACE LTD THIS DOCUMENT IS PROVIDED IN CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

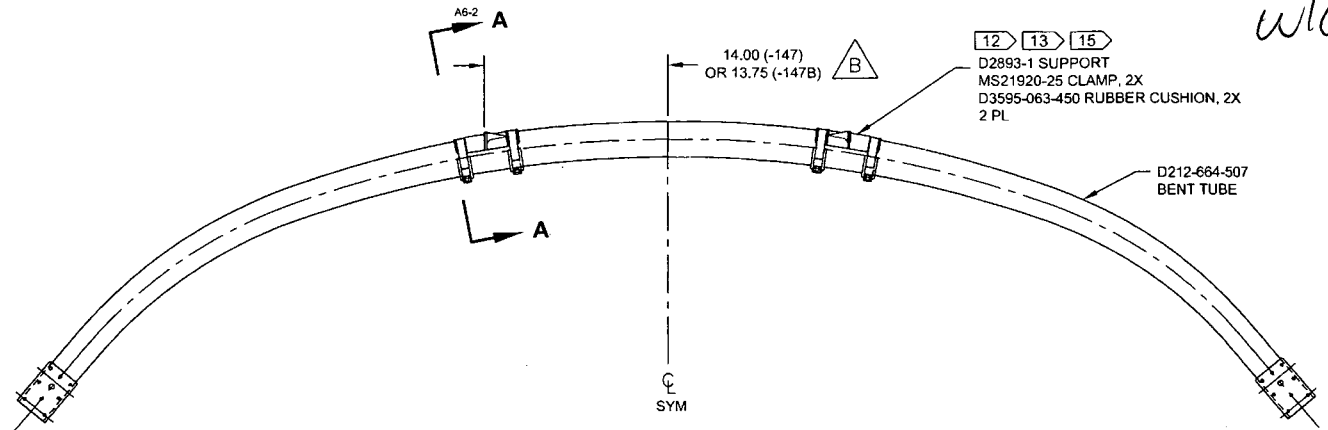
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

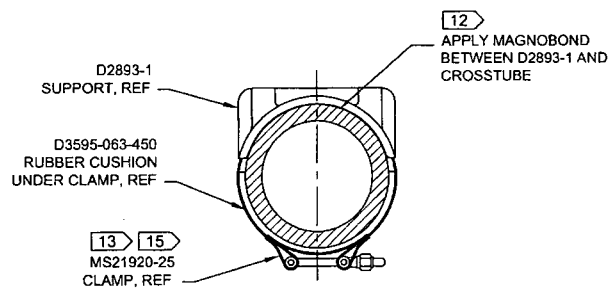
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

wlo 67880



**D212-664-147/-147B  
ASSEMBLY DETAIL**



**SECTION A-A** D5-2  
SCALE 4X

**RELEASED**  
2009-10-29

DESIGN	9P	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	9P	DRAWING NO.	REV. B
MFG. APPR.	SS	D212-664-147	SHEET 2 OF 4
APPROVED	149	TITLE	SCALE
DE APPR.	149	CROSSTUBE (205/212/412 LOW FWD)	NTS
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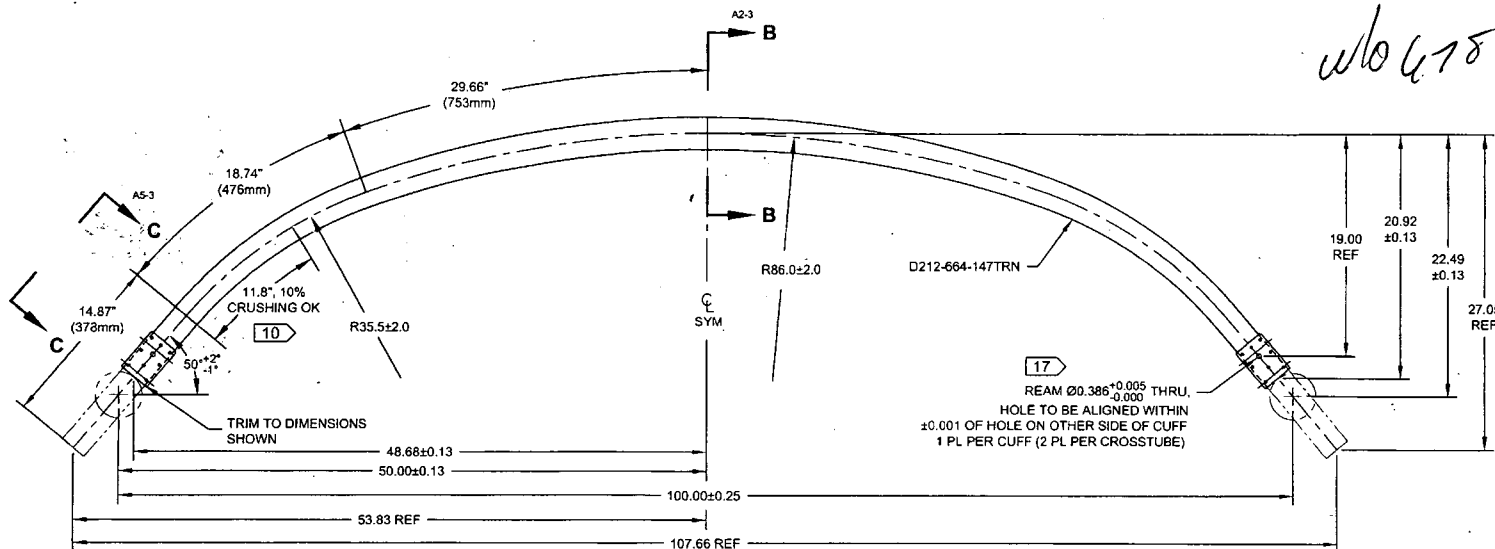
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

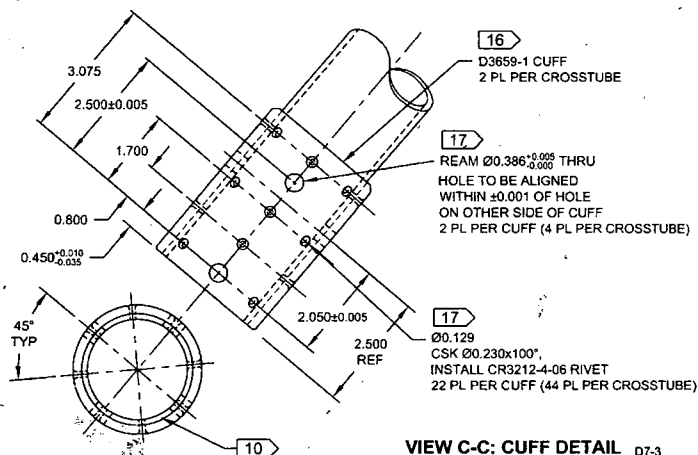
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

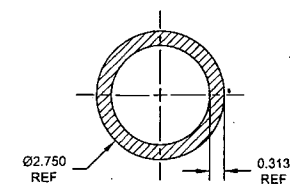
**NOTE:** Date & initial all entries



**D212-664-507**  
**BENDING AND DRILLING DETAIL** 10 B



**VIEW C-C: CUFF DETAIL** 07-3  
 SCALE 4X



**SECTION B-B** D5-3  
 SCALE 4X

**RELEASED**  
 2009-10-29

DESIGN	9	<b>DART AEROSPACE LTD</b>
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA
CHECKED	9	DRAWING NO. REV. B
MFG. APPR.	19	D212-664-147 SHEET 3 OF 4
APPROVED	19	TITLE SCALE
DE APPR.	19	CROSSTUBE (205/212/412 LOW FWD) NTS
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DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

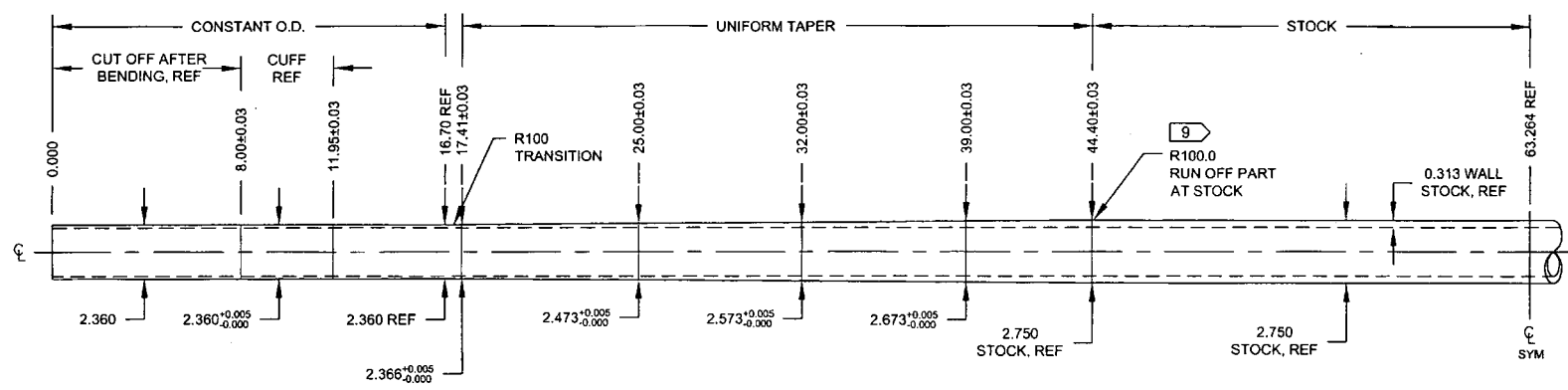
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Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

W667880



**D212-664-147TRN**  
**TURNING DETAIL**

**RELEASED**  
2009-10-29

DESIGN	97	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	97	DRAWING NO.	REV. B
MFG. APPR.	97	D212-664-147	SHEET 4 OF 4
APPROVED	97	TITLE	SCALE
DE APPR.	97	CROSSTUBE (205/212/412 LOW FWD)	NTS
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



## Chris Provencal

---

**From:** David Shepherd <dshepherd@dartaero.com>  
**Sent:** Tuesday, June 14, 2011 10:59 AM  
**To:** 'Chris Provencal'  
**Cc:** 'Mike Petsche'; 'Dan Stow'; 'Eric Downing'  
**Subject:** RE: Procedure for installing supports.

Made a couple of small changes.

- ~~Remove finish on xtube in area of support down to alodine finish.~~ *95 req'd* *P 11.06.15*
- Touch up alodine on xtube in affected area
- Completely remove any finish on support, scuff bottom surface of support
- Apply a 0.04" – 0.07" layer of Proseal 890 class B-2 on bottom of support and install wet.
- Install clamps and torque per dwg
- Clean up excess proseal
- Touch up paint finish as req'd per QSI 005
- Let cure for 72 hours after installation, recheck torque.

David

---

**From:** Chris Provencal [mailto:cprovencal@dartaero.com]  
**Sent:** Tuesday, June 14, 2011 8:08 AM  
**To:** David Shepherd  
**Cc:** Mike Petsche; 'Dan Stow'; Eric Downing  
**Subject:** Procedure for installing supports.

David,

We have two 212 fwd crosstubes that they need to get ready. The proposed procedure for modifying the off-center supports

- Remove finish on xtube in area of support down to bare metal.
- Remove finish on underside of support, scuff bottom surface of support
- Touch up alodine on xtube in affected area
- Apply a 0.04" – 0.07" layer of Proseal 890 class B-2 on bottom of support and install wet.
- Install clamps and torque per dwg
- Clean up excess proseal
- Touch up paint finish as req'd per QSI 005
- Let cure for 72 hours after installation, recheck torque.

Is this acceptable?

-Chris



## LIQUID PENETRANT TEST REPORT

P-05610

PAGE 1 OF 1  
TIME AM ☒ PM ☐

CLIENT DART AEROSPACE DATE MAY-20-2011  
ATTENTION JODA LACEE / CHANTAL / IAN / MAT ACUREN JOB NO. 138-11-02129  
ADDRESS 1270, ABERDEEN RD POWO NO. 14143  
HAWKESBURY, ON WORK LOCATION AS ADDRESS  
ACCEPTANCE STD. ASTM E1417/CSF-038 REV./DATE 2005  
PROJECT WET FLUORESCENT LIQUID PENETRANT INSPECTION ON 100% OF THE EXTERNAL SURFACE  
ITEM(S) EXAMINED - SEE BELOW

JOB DESCRIPTION PROCEDURE NO. LT-002 REV./DATE 2003 TECHNIQUE NO. LT-002 REV./DATE 2003  
PART NO. MATERIAL ALUMINUM THICKNESS N/A  
SCOPE PERFORMED A WET FLUO L.P.I. ON 100% OF THE EXTERNAL SURFACE AND 4 CROSS TUBES

## TEST DETAILS

METHOD <input checked="" type="checkbox"/> FLUORESCENT <input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH <input type="checkbox"/> SOLVENT REMOVABLE <input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND <u>MACNAFL X</u>	BLACK LIGHT S/N <u>13798</u> <input type="checkbox"/> OUTPUT > 1000 $\mu$ W/cm <sup>2</sup> <input checked="" type="checkbox"/> AMBIENT < 2 fc
PENETRANT <u>ZL-67</u> MINIMUM DWELL TIME 10 MIN.	LIGHTING EQUIP. <input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT <input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER <u>H<sub>2</sub>O</u> MINIMUM DRY TIME > 10 MIN.	OTHER
DEVELOPER <u>SRD-SS</u> MINIMUM DWELL TIME 10 MIN.	LIGHT METER S/N
DEVELOPER TYPE <input checked="" type="checkbox"/> NON AQUEOUS <input type="checkbox"/> AQUEOUS <input type="checkbox"/> DRY	CAL DUE DATE <u>Nov/05/2011</u>

## TEST SURFACE

SURFACE CONDITION <input type="checkbox"/> AS GROUND <input type="checkbox"/> AS WELDED <input type="checkbox"/> MACHINED <input type="checkbox"/> SHOT BLASTED <input checked="" type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE <input type="checkbox"/> < -4°C/ 20°F <input type="checkbox"/> -4°C/ 20°F TO 10°C/50°F <input checked="" type="checkbox"/> 10°C/50°F TO 52°C/125°F <input type="checkbox"/> > 52°C/125°F

RESULTS- (☐ METRIC ☐ IMPERIAL)

1	CROSSTUBE W.O. ID 69560	✓
2	CROSSTUBE W.O. ID 69561	✓
3	CROSSTUBE W.O. ID 69880	✓
4	CROSSTUBE W.O. ID 69181	✓

ITEM ID	D212-664-101	FWD
ITEM ID	D212-664-101	FWD
ITEM ID	D212-664-107	FWD
ITEM ID	D212-664-107	FWD

NO RELEVANT INDICATION WAS DETECTED  
AS PER APPLICABLE STANDARD

RT 11-05-20

## Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

## Standard of Care

By performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

## SIGNATURES

CLIENT REPRESENTATIVE <u>Ian T. Tiley</u>	PRINT	SIGNATURE	DTR # <u>E44658</u>
TECHNICIAN (SIGNATURE): <u>J. Desrosiers</u>	1 <sup>ST</sup> TECHNICIAN	2 <sup>ND</sup> TECHNICIAN	REPORT REVIEWED BY: <u>A</u>
NAME (PRINT): <u>J. Desrosiers</u>	CGSB LEVEL <u>2</u> SNT LEVEL <u>2</u> CGSB REG. NO. <u>3049</u>	CGSB LEVEL <u>—</u> SNT LEVEL <u>—</u> CGSB REG. NO. <u>—</u>	NAME INITIALS

WHITE - CLIENT COPY

CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

GOLD - OFFICE COPY